

Software Engineering

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Smart Home Automation System

**Introduction:**

A smart home system utilizes IOT technology to streamline household operations, enhance comfort, improve security, and increase energy efficiency. By integrating various devices and appliances homeowners can control and monitor their environment remotely through smartphones, tablets, or voice activated assistants.

**Objectives :**

The main objectives of smart home automation include:

* Allowing the users to control different devices remotely and includes scheduling tasks such as adjusting lighting or heating.
* Help monitor energy consumption leading to reduces utility bills. Devices can automatically adjust settings based on time
* It improves home security through real time monitoring, alerts and remote access. The users can get notifications of suspicious activity.

**Requirement Gathering**:

**Identify Stakeholders:**

**Homeowners:**

Individuals or families who will use the smart home system to enhance their living.

**Project Team:**

**Developers:** Software and hardware engineers responsible for building the system .

**Designers:** who create the user interface for the system

**Project Managers:** Individuals overseeing the project timeline resources and communication

Suppliers and Vendors:

Companies that provide the hardware and software components necessary for the project.

Technical Support Teams

Support personnel who assist with installation, maintenance and troubleshooting of the system.

Investors or Sponsors:

Individuals or organization that provide funding for the project and expect a return on investment .

**Step 2: Communication**

Establish Communication Channels:

* Set up regular meetings , emails for ongoing discussions

Stakeholder Updates:

* Provide regular updates to stakeholders on progress, changes and challenges.

Feedback Loop:

* Encourage continuous feedback during the development process to ensure alignment with user needs.

Collaborative Sessions:

* Host brainstorming sessions with stakeholders to refine ideas

Step 3: Planning:

Define Project Scope

* Outline the boundaries of the project, specifying what will and will not be included.

Resource Allocation:

* Identify necessary resources, including hardware, software and team members and allocate them accordingly.

**Step 4: System Modeling**

System modeling helps in visualizing and designing the architecture and interactions of the smart home automation system. It ensures the system will function as expected and can be effectively implemented.

* **Use Case Modeling**
* Create use case diagrams to describe the interactions between users and the system.
* Define actors (homeowner, system administrator, external services) and their interactions (e.g., controlling lights, setting temperature, receiving alerts).

 **Functional Decomposition**:

* Break down the system into subsystems or modules (e.g., device management, user interface, communication protocols).
* Create block diagrams or hierarchical charts to show the different components.

Prototyping:

Build a prototyping of thesystem to test basic functionalities and gather feedback.

**Step 5:**

**Deployment:**

**Deployment Objectives**

* Ensure the smart home system is installed, configured, and operational in users' homes.
* Provide a seamless experience for users to control and monitor their smart home devices.
* Gather user feedback post-deployment to make improvements.

**2. Deployment Strategy**

* **Phased Deployment**: Roll out the system in phases to manage risks and ensure a smooth transition. This could involve deploying to a small group of users first and then expanding to a wider audience.

**3. Deployment Steps**

**Step 1: Preparation**

* **Documentation**: Prepare comprehensive documentation for installation, user guides, and troubleshooting.
* **Training**: Train technical support teams on system features, installation processes, and common troubleshooting issues.

**Step 2: Installation**

* **Site Assessment**: Conduct assessments of users' homes to determine optimal placement for devices (sensors, cameras, smart hubs).
* **Hardware Setup**: Install necessary hardware components, including smart devices, sensors, and hubs.
* **Software Installation**: Deploy the smart home application on users' smartphones, tablets, or computers.

**Step 6:**

**Testing**

* **Functional Testing**: Verify that all devices are functioning as intended. This includes checking remote access, scheduling, and alert functionalities.
* **User Acceptance Testing (UAT)**: Engage homeowners to test the system and gather feedback regarding usability and functionality.

**Step 7:**

**Delivery/Feedback**

Officially deliver the system for all users. Ensure that customer support is available for immediate assistance.

Feedback: Continuously monitor system performance and user interactions to identify any issues.